U N D E R S T A N D I N G

B R A I L L E

HV1669
.Am35
Un2

Understanding braille

1 • • 4
2 • • 5
3 • • 6

LINE 1

a b c d e f g h i j
1 2 3 4 5 6 7 8 9 0

Line 1, consisting of the first 10 letters of the alphabet is formed with dots 1,2,4,5 in the upper part of the braille cell. When preceded by the numeric indicator these cells have number values.

LINE 2

k l m n o p q r s t

Line 2 adds dot 3 to each of the characters of Line 1.

LINE 3

u v x y z and for of the with

Line 3 adds dots 3 and 6 to each of the characters of the first line.

LINE 4

ch gh sh th wh ed er ou ow w

Line 4 adds dot 6 to each of the characters of the first line.

LINE 5

, ; : . en ! () “/? in ”

Line 5 repeats the characters of Line 1 in the lower portion of the cell, using dots 2,3,5,6. Most of the characters have punctuation values.

LINE 6

st ing # ar ’ —

Line 6 is formed with dots 3,4,5,6.

LINE 7

general accent sign

used for two-celled contractions

italic sign; decimal point

letter sign

capital sign

Line 7 is formed with dots 4,5,6.

Although punctuation and letter values are given for each configuration, most of the configurations have other meanings when used in conjunction with different braille characters.

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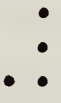
FOR HUNDREDS OF YEARS there was no adequate system of reading and writing to educate the blind and many thought they were uneducable. This, of course, is not the case, but it took a blind, French youth to prove otherwise. Today blind people throughout the world can read and write due to the accomplishments of Louis Braille, who, as a blind and concerned student in 1824, devised the system that became known by his name.

What is braille?

BRAILLE IS A SYSTEM of raised dots for touch reading and writing by the blind. The entire system is derived from an arrangement of six dots referred to as the braille cell. Each arrangement of dots and each blank space occupy a cell. To aid in identifying the dot positions which comprise the various braille characters, Louis Braille numbered the dot positions of his cell 1-2-3 downward on the left, and 4-5-6 downward on the right.

Sixty-three different dot patterns, or braille characters, can be formed by arranging the dots in different positions and combinations, as can be seen in the seven-line accompanying table. To the 10 characters of the first line Braille assigned the first 10 letters of the Roman alphabet, a-j. The characters of the first line, in order of their occurrence on the table, also assume the number values 1-0, when preceded by the numeric indicator found in the sixth line.



To the 10 characters of the second line, Braille assigned the next 10 letters of the alphabet, k-t, and to the first five characters of the third line Braille assigned the letters u, v, x, y, z.

Twelve years after he had developed and introduced his system, Braille assigned the letter "w" to the tenth character of the fourth line in order to meet the alphabetic needs of the English language. Eight of the 10 characters of the fifth line are punctuation marks. The apostrophe and hyphen are assigned to the fifth and sixth characters of the sixth line.

The seven dot patterns of the seventh line are derived from dots 4-5-6 of the braille cell. No true inkprint values can be shown for these dot patterns because they do not generally function like the other characters which, with only some exceptions such as the numeric in-

dicator, function as base characters. Like the numeric indicator, the dot patterns of the seventh line, such as that for the capital sign or the italic indicator, serve as modifiers when placed before a letter or before some other base character. Through the application of this principle, the various base characters can function in multiple ways. For instance, dot 5 when preceding the letter "d" means "day."

Every language employs accents or other markings but an English braille reader need only learn the "general accent sign" also found in the seventh line. When this character precedes a letter it indicates an accent or some other related marking in the inkprint. This limits the information given the reader to an indication that the letter or letters of a word contain some sort of marking, but it also eliminates the necessity of learning the special symbols of different languages.

Still another principle which makes possible the maximum utilization of the 63 dot patterns is the assigning of values according to the specific notation employed in a given subject or language. Thus, the tenth character of the fourth line means the letter "w" to the braille reader, if he is reading English, German, or another language that employs this letter; omega, if he is reading a braille book in Greek; and "B a-quarter," if he is learning a musical composition.

These characteristics of braille explain the reason for the various braille codes–literary, mathematics and scientific, music, etc.

How did it start?

THE FIRST FORM of touch reading attempted for the blind consisted of the same letters and numerals that are read by the sighted, except that the characters were embossed and enlarged to be felt by the fingers. When Louis Braille entered the Royal National Institute for the Young Blind in Paris in 1819 there were 14 books in embossed characters which were rarely used because the blind found them so hard to read. The basic difficulty of the Roman alphabet with respect to finger reading is that tedious scanning of each character is necessary before the blind person can synthesize each letter into its complete shape. Then, after putting each character into a whole, the touch reader must put the letters together to form the word.

In 1824 when Braille introduced the first version of his system at the Paris School for the Young Blind the misconception that it was feasible to "speak to the fingers the language of the eyes" had become deeply entrenched in the education of the blind. Braille was faced

with determined opposition by the sighted teachers who argued that it would be absurd to teach the blind an alphabet whose configurations were so different from those of standard raised print. The pupils, however, immediately adopted the system. Now they could take notes in class, write their composition assignments using conventional spelling and punctuation, copy whole books from dictation, and—maybe most important of all—record their own thoughts. It was at the insistence of the pupils, as well as of the blind teachers at the school, that the braille system finally gained official recognition in 1854, 30 years after Braille had first introduced it.

First official recognition of the braille system in America took place at the Missouri School for the Blind in 1860. Until then, all American schools for the blind had been teaching various forms of raised-line characters. Just as the insistence of the blind forced the adoption of braille at the school in Paris, it was the worldwide demand by the blind that made braille universal, with appropriate adaptations to suit the characteristics of each language.

What other raised-dot systems have been tried?

IN 1819 a French army officer, Charles Barbier, had worked out a system of embossed dots and dashes for night communication in battle fields. This "night writing" was intended to be read by touch. It did not meet with success among Barbier's soldiers, but from it he devised a reading method for the blind called Sonography. Because the system contained too many dots to the character it was unfeasible for touch reading. Nevertheless, Barbier's efforts to help the blind provided Louis Braille with the basic concept of dot writing. By cutting Barbier's original 12-dot cell in half, Braille derived his 6-cell system.

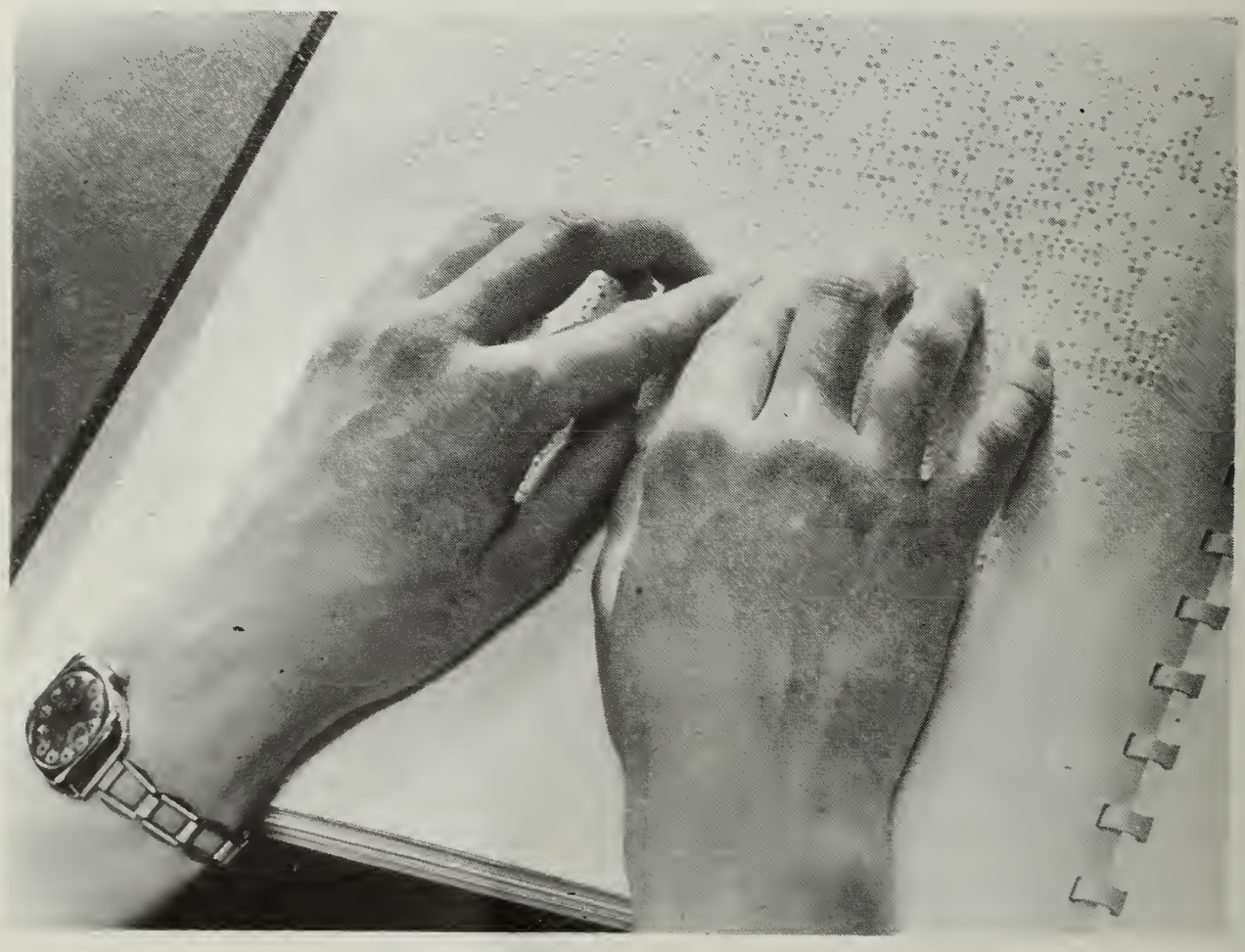
In the United States dissatisfaction with the impracticability of line type as a means of reading and writing for the blind was growing; yet the example of the Missouri School for the Blind to adopt braille was not readily followed. In 1868 William Bell Wait, superintendent of the New York Institution for the Blind, now the New York Institute for the Education of the Blind, published a system of raised dots known as New York Point. New York Point gained official recognition by the American Association of Instructors of the Blind in 1871 and was widely used in schools for the blind for 47 years.

But in 1878 Joel W. Smith, a blind piano tuning teacher at Perkins Institution for the Blind in Massachusetts (now Perkins School for the Blind), introduced a raised-dot system based on Louis Braille's six-dot cell. Each cell arrangement was assigned a different meaning to take into account the frequency of recurring letters in the English language. First known as modified braille, then as American braille, the letters recurring most frequently were represented by the braille characters comprised of the least number of dots in this system.

Although American braille never became officially accepted, its use spread sufficiently to put it on a competitive status with New York Point as well as with the original braille system, which since its adaptation to English had become known as British braille.

How is braille read?

MOST BRAILLE READERS read primarily with one hand—left or right. An undetermined number of blind persons, however, who are not



generally ambidextrous in other areas can read braille with both hands. Most frequently, the reading is done with the index finger, but some persons also use the middle and ring fingers. Experienced braille readers usually subconsciously exert the required light finger pressure for optimal perception, identification, and discrimination of the braille characters.

This phenomenon can take place only through consecutive stimulation of the fingers by the dot patterns. Such stimulation occurs by moving the hand or hands on each line of writing in a steady left to right motion. Some readers are able to read with a single hand at the rate of 125 words per minute, and a few braille readers, through ambidextrous reading, can double this speed to the rate of 250 words per minute. In general, the average reading rate has been estimated to be about 104 words per minute.

It is the simplicity of braille that enables such reading speeds to be attained. The raised dots allow instantaneous comprehension of the letters as single wholes, a function indispensable to the reading process. Ordinary print-embossed characters, on the other hand, do not permit this immediate comprehension and necessitate finger groping, which does not actually constitute true reading.

To be suitable for tactual reading, the raised dots must be simple in design, and their maximum size must not exceed the area of the reading finger or fingers. The writing must be one dimensional; that is, the character must not extend beyond the base line of writing. Otherwise, vertical finger-groping, instead of left-to-right progressive movements would result.

Physical comfort is of utmost importance to reading braille. The reading matter should rest so that while sitting the reader's hands will be at a level slightly below his elbow.

Is braille a type of shorthand?

ALTHOUGH CONVENTIONAL SPELLING is perfectly feasible in braille, when the system was adapted from French to other languages certain characters were assigned the value of an entire word. Other characters were given the value of a letter-group to be used either as a whole word or just part of a word, and still other characters signify just letter-groups. In English braille, for example, the letter "b" when alone or adjacent to a punctuation mark, the capital sign, or the italic indicator stands for the word "but." The "ch" sign under these same conditions means "child." The last five characters of the third

line stand respectively for the words "and," "for," "of," "the," and "with," but they are also used as part-word letter groups, such as "candy," "fort," "soft," "they," and "withhold."

This method of writing is known as contracted braille, and the characters used in this way are called braille contractions. The method differs from regular shorthand for the sighted in that, by assigning actual letter-group values to most of the contractions, conventional spelling is significantly retained in spite of the contractions.

What are grades of braille?

THERE ARE SEVERAL different grades of braille with each grade offering more contractions than the previous one. Braille as developed by Louis Braille is Grade 1 as we know it today. Grade 1 braille uses characters bearing a one-to-one relationship to the alphabet without any contractions.

Toward the end of the 19th century the British developed a system of contractions called Grade 2 braille. The system actually consisted of almost 200 contractions and words written in abbreviated or short form. Because of the competitive struggle among three raised-dot systems in America these adaptations became known as British braille.

After the establishment of Grade 2 braille, a modified form of British braille, Grade 1½, was adopted in the United States in 1918. Like British braille, it consisted of the regular alphabet and punctuation marks developed by Louis Braille. Only a portion of the simpler contractions were retained, however, and all the short-form words were excluded. But in 1932, Grade 2 was officially adopted thereby achieving a reasonable degree of uniformity in braille embossing among English-speaking countries. Persons with a knowledge of the more complicated Grade 2 braille did not require special instruction to be able to read Grade 1½, but Grade 1½ readers could not read the more contracted Grade 2 publications without a knowledge of the additional Grade 2 contractions and short-form words. Anyone with a knowledge of Grade 2 or Grade 1½ could, of course, read and write Grade 1 braille.

Grade 3 braille is an extension of Grade 2 braille using additional contractions and short-form words and outlining words by omitting vowels. Currently, Grade 3 is used mostly for personal convenience in note-taking with Grades 1 and 2 constituting the official systems in English-speaking countries. Braille shorthand, on the other hand, is a

phonetic system of highly contracted words and phrases frequently used in business and commerce. It has practically fallen out of use in the United States where most blind typists take dictation through recording units with play-back devices.

How is braille written?

THE EMBOSSING DEVICE used by Louis Braille consisted of a sliding rule guided by the two edges of a board. The rule, pierced by little windows, permitted a blind person to emboss dot patterns with a stylus on heavy paper placed between the rule and the board. Today, braille slates, a variation of this embossing method, are still in demand by many braille users. All modern braille slates, whether desk or pocket-size models, consist essentially of two metal or plastic plates (the guide) hinged together to permit a sheet of paper to be inserted between the two plates. The upper plate functions as the original rule, pierced by little windows. Directly under each window, the lower

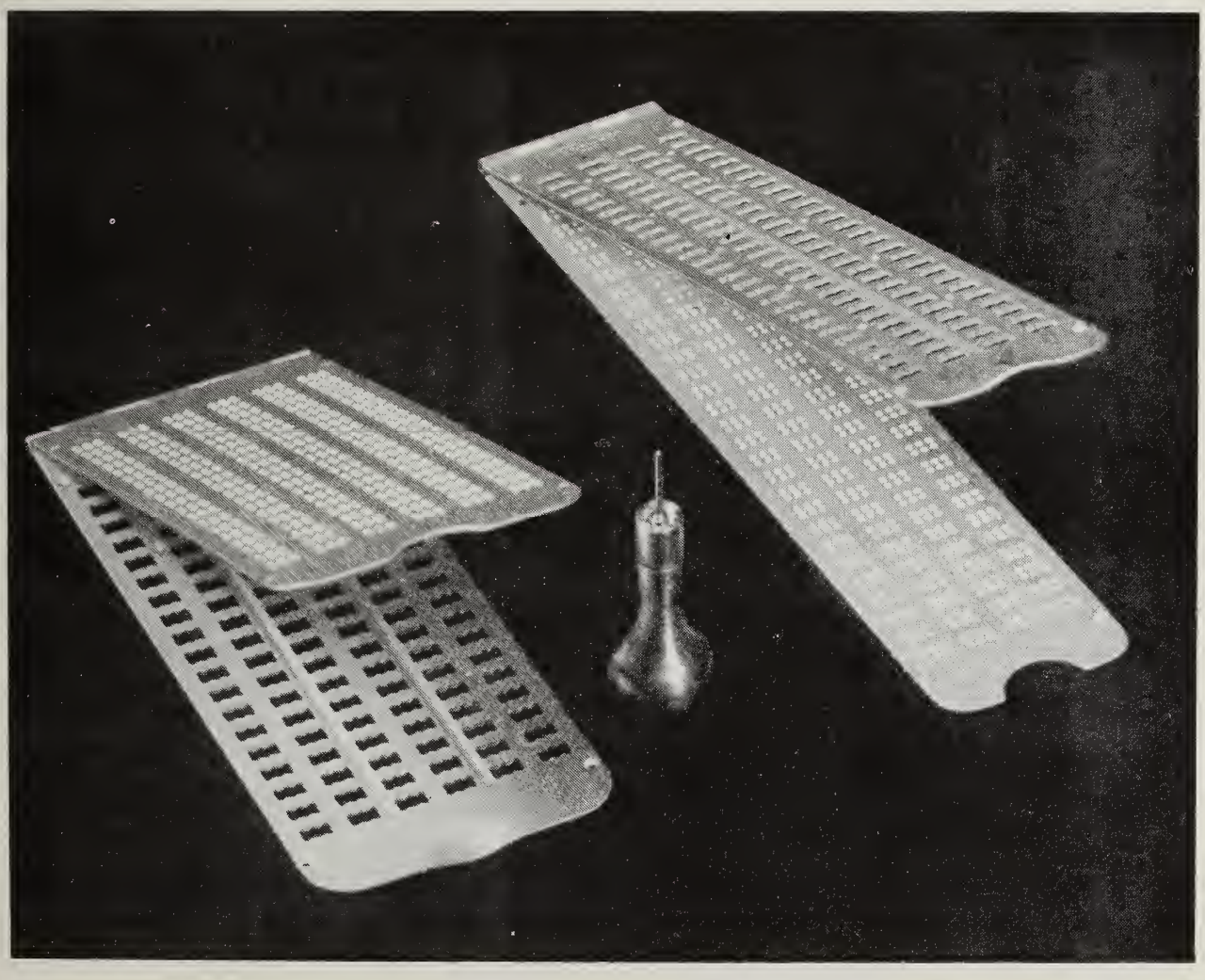


plate contains slight pits arranged in the pattern of the braille cell. The dot embossing takes place when the stylus is pressed downward against the paper in order to form each braille character, dot by dot against the corresponding pit of the lower plate. The writing can be be read only when the written sheet or card is turned over so that the dots will face upward.

So, when *writing* on a braille slate, it is necessary to write completely from right to left and to reverse the normal numbering of the dots of the braille cell. Otherwise all the braille characters would be completely reversed when the sheet of paper is turned so that the embossing faces up. Learning the numeric identification of dot positions eliminates the necessity to memorize each braille character as a mirror image of the normal dot pattern. As the motions of writing become part of the learner's subconscious mind, it is less and less necessary for him to recall specifically the numbering of the various dot patterns. That is to say, except for the element of physical fatigue, slate writing can become as automatic to the blind as pencil writing is to the sighted.

Besides slate writing, braille is produced on special machines suited to the characteristics of the braille cell and dot patterns. These quicker methods of writing braille had their beginnings in 1892 when Frank H. Hall, superintendent of the Illinois School for the Blind, demonstrated the first braille writing machine, the Hall Braillewriter, still in use today in modified form. This device enabled efficient operators to attain speeds from 40 to 60 words per minute. Other similar machines are the Perkins Brailler and Lavendar Braillewriter.

Early in the 1920's a method was developed in the United States making it possible to emboss on both sides of a master copy without the dots on one side opposing those on the other side. Called interpointing, this method utilizes all available line space on the paper sheets, thus, cutting in half the number of sheets required in a braille transcript. In turn, the bulk taken up by braille volumes is considerably reduced to about 90 sheets.

With advances in technology braille now is being produced by automation with changes in techniques constantly occurring.

Who produces braille?

PRINTING HOUSES meet the general-interest needs of the braille-reading population. The cost of braille-producing is to a very significant extent defrayed by the Library of Congress Books for the Blind and Physically Handicapped program, authorized in 1966, and previous similar legislation passed by Congress. Books, magazines, and other publications put into braille or recorded form through the Library of Congress program are circulated and loaned to visually and physically handicapped persons qualifying for these services under the law, through the regional library-system designated by the Library of Congress.

Transcribing service programs, which include classes for prospective volunteer transcribers to be trained by qualified braille instructors, are usually conducted by local libraries with departments for the blind or by agencies serving blind persons. Like those braille transcribers who receive their training through the Library of Congress' correspondence course, the locally trained braille students must also pass the Library of Congress Braille Proficiency Test and receive their Braille Proficiency Certificates in order to be recognized as qualified transcribers. It is estimated that there are 2,300 qualified braille transcribers in the United States. Most of them are women

volunteers who work in their homes. Usually they transcribe on a braille writer. The volunteer braille transcription services are used by blind students who attend local community schools for the sighted, blind college and university students, and those persons engaged in professional occupations who need access to the most up-to-date publications relating to their specialties.

Who reads braille?

IN THE UNITED STATES 443,000 persons are classified as legally blind, but this estimate is based on the definition that legal blindness is "20/200 or less in the better eye with best correction or visual acuity of more than 20/200 if the widest diameter of the field of vision subtends an angle no greater than 20 degrees." Most of these persons, however, are not braille users.

Legal blindness per se is not necessarily an impediment to eye reading because legal blindness in most instances does not mean total absence of eyesight. A substantial proportion of the legally blind population is capable of reading ordinary print in large-type sizes or with optical aids and, therefore, cannot be considered potential braille readers. Among the total number of legally blind, only 12 percent have light perception only, and the number of persons who are totally blind is even smaller.

Another characteristic of the legally blind population which curtails the number of potential braille readers is that a large percentage of blindness accompanies old age. According to the National Society for the Prevention of Blindness, 50.4 percent, or 223,000, of the legally blind are 65 years of age or older. General deterioration associated with advancing age, such as loss of finger sensitivity, chronic fatigue, failing memory, etc., precludes the learning of braille and further reduces the number of potential braille readers.

An additional factor which further cuts down the braille using population is found in the differences which exist among newly blinded adults, such as extent of education, type of employment before onset of blindness, personal living habits, etc. Regarding the learning and retention of the contractions of braille, the fact must not be overlooked that "the blind" are no homogeneous group. On the one hand, there is the blind young child starting his education at the kindergarten level. On the other hand, there is the newly blinded older person who has already acquired visual and writing skills and an

adult's vocabulary. With respect to the learning procedures required and the reasons for learning braille, the difference between these two groups is most important.

The fact must not be overlooked that a newly blinded adult might wish to limit his knowledge of braille just to those elements that would enable him to continue following particular pleasures or needs, as for example, using braille-marked cards to play with sighted friends, keeping personal records (dates, telephone numbers, or addresses), or performing any activities that would not demand a complete knowledge of the whole braille system. In all instances the rehabilitational needs of the newly blinded adult should be the basis for establishing how much of the braille system he needs to be taught.

This principle, however, is in no way applicable to blind students at the elementary grade level or higher levels of learning. For them braille is as much a part of learning as is ordinary print for sighted students. It has become the established practice to introduce blind children simultaneously to the alphabet and braille contractions at the outset of their reading experiences. Since currently a majority of blind children attend community schools that offer programs for the blind and visually impaired, the texts used by the sighted children are transcribed into Grade 2 braille. This means that the blind children encounter and must learn the braille contractions as they occur in the vocabularies of the texts used in schools for the sighted.

To date, the actual number of all braille users in the United States is approximately 45,000, while the number of persons who use braille as the primary reading mode is about 33,000.

Why is braille so important to blind people?

LOUIS BRAILLE'S formal learning began through the spoken words of the school master at Coupvray, France, where from age seven to nine he attended classes with sighted children, and the books they used were, of course, inaccessible to him. It was not until he entered the Royal National Institute for the Young Blind in Paris at age 10 that he realized how difficult it was for his fellow students to learn through so much oral teaching.

Without the opportunity of actual reading experience, blind persons never would be able to conceptualize spelling, the sentence, the paragraph, the use of punctuation marks, methods of numeric com-

putations, the arrangement of information into charts and tables, the use of footnotes, the use of the dictionary, and other aspects of written information that are so familiar to the literate sighted. The benefits inherent in direct visual or tactual reading experiences cannot be replaced by listening to the printed word through someone else's voice.

In considering the value of the information media, mention must be made of the approximate 600 children and 4,000 adults who are not only blind but deaf as well. To them the benefits of braille are beyond description. It is their only means of communication with local, national, and international events. It is virtually their only source of literary entertainment.

Being able to write down one's thoughts whether in ink or in braille, enables the human mind to hold a mirror up to itself. The written word, silent and void of the subjective attitude indicated by the tonal quality and intensity of the spoken word, enables the intellect to look into its own inner content, thus obtaining maximum objectivity when trying to solve a difficult problem. "Without books the blind can never really learn," Braille once said to his father.

Braille would have been even more correct if he had said that without being able to manage the written word and other written expressions, blind persons could never function as true members of a literate society. As far as blind persons are concerned, the exclusive aural intake of information would not expose them to the techniques of written communication that they need to "see" in order to comprehend, absorb, and then apply.

American Foundation for the Blind
15 West 16th Street, New York, N.Y. 10011